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THE OHIO STATE UNIVERSITY

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Educational Research Bulletin

FEBRUARY 12, 1936
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Grades Seven to Twelve Ohio State University School

THE present number of the EDUCATIONAL RESEARCH BULLETIN continues the discussion of the Ohio State University School introduced through the May, 1935 BULLETIN. In that issue the work of the University School in the kindergarten and first six grades was presented. Many requests for similar information concerning the upper school have been received. Since it is impossible here to describe in detail the work of the more advanced classes, the writers of the present issue have decided to limit the discussion to those matters which deal with the integration of subject-matter. Discussion of the integration of personality, of devices for presenting work, of evaluation, and of the exact nature of subject-matter are purposely omitted from this presentation. As with the previous issue, the material is the work of many persons.

PUBLICATIONS COMMITTEE
University School

Integration in the Educational Philosophy, Practice, and Experience

THE May, 1935, issue of the EDUCATIONAL RESEARCH BULLETIN introduced the work of the University School of Ohio State University to the schools of Ohio and to other interested readers. In view of the fact that the report just mentioned dealt largely with the kindergarten and elementary grades, it was further decided that this report should deal with the upper school, the seventh through the twelfth grades.

In the earlier report, furthermore, we introduced the University School first of all by means of a statement that raised

"certain implications" of our program, which are consequences of the general educational philosophy of our faculty. We feel that it is appropriate to begin our discussion of integration by pointing out at least the most direct references to integration within that statement.

[In an experimental school] "we are actually engaged in developing a generalized pattern of conduct or a way of life. [Furthermore], the school environment must be so set up that the way of life cultivated in the school will be maintained and extended when the pupils pass on from the school environment to the larger social environment outside the school." . . . [Since] habits . . . cannot be relied upon simply "to carry over" [and since] we must not expect too much from any attempt to bring the situation from the larger environment into the school through merely "vicarious experience" or "description," [we rely in part upon increasing that] "certain degree of continuity . . . secured already . . . the opportunity to become participants, emotionally, in man's struggle to control his environment and to build himself a better civilization . . . [and upon extending] the range of this participation so as to make it result in the destruction of our traditional compartmentalization . . . [so that] participation will take the form of sharing in the task of improving our social aims."

[Therefore] the philosophy of our University School places a great deal of emphasis upon the integration of the school experience of the individual student so that he develops a sensitivity and an effective disposition to see his education whole, as whole as life with the interrelationship of all its factors. He is guided to the establishment of a personal philosophy of living . . . [a philosophy], by continuous reconstruction [in the light of his growth through experience, appropriate to him].

Perhaps nothing more indicative of the philosophy of the school can be said than that the individual member of the school community is, himself, seen entire. The whole child is educated to physical, mental, personal healthfulness.[1]

In setting up our curriculum with this philosophy in view, we made a number of separate attempts to establish criteria for such a procedure and for the evaluation of our results in practice. Three of these attempts were recorded in the May BULLETIN, and brief reference is made to them here because of their demonstration of our emphasis upon achieving integration.

[First, our question], Does the educational experience . . . provide

[1] The quotations are taken from Mr. Bode's account in Chapter I of *The Educational Frontier* of "The Confusion in Present-Day Education" and were used in our former statement which is also quoted here. EDUCATIONAL RESEARCH BULLETIN, XIV (May 15, 1935), pp. 118–23.

for real participation by each student in each of these functions of living [which we drew up as] summarizing the life of both school and outside communities?

[Second, our use of the] classification of desirable personal traits . . . [among which] . . . ability to obtain information from sources other than reading, open-mindedness, the power and habit of analysis.

[Third, our consideration of the] simpler classification of educational ends into four disciplines:

> Health with all its physical and mental implications
> Co-operation
> The ability and disposition to think effectively, analytically, and dispassionately
> Creativeness

WE HAVE reproduced here these excerpts from the discussion because we are certain that in the brief statement of our educational philosophy are included the following emphases upon integration:

1. Integration of our individual, faculty philosophies of education into a growing and a concerted faculty philosophy of education.
2. An attitude towards the individual student which recognizes him entire and provides for him as a unique person . . . towards "physical, mental, personal healthfulness . . . through his "emotional and social adjustments," through the "integration of the school experience of the individual student."
3. The integration of our school community into a "generalized pattern of conduct or a way of life," *the democratic way* of living, based upon the potentially equivalent dignity and worth of the individual, and co-operation of individuals into one social group or another.
4. The integration intellectually of the individual, who sees his education as whole as life; continuously reconstructs his own philosophy in the light of experience; develops the "ability and disposition to think effectively, analytically, and dispassionately"; and "shares in the task of improving our social aims."
5. Integration of home and school (parents and teachers) as the two most important institutions carrying the responsibility of educating children.
6. Integration of school and outside communities through: study organized around functions of living; introducing an analysis of the basic conflicts just described into the curriculum; intensifying the student's opportunity to "participate, emotionally, in man's struggle to control his environment and to build himself a better civilization"; and educating toward the disposition to "share in the task of improving our social aims." (We believe that democracy must be carried from the school community into the larger community where it is needed.)

Do we mean to imply that the University School tries to "integrate a student and turn him out as a finished product?" Certainly not; such an idea would involve a misunderstanding of the entire concept of integration.

We do mean that a student at the University School lives for a part of each school day in a school community which is already described in terms of what we, consciously as teachers and increasingly consciously as students gaining experience, are attempting to achieve, and in the articles that follow in terms of what we have achieved to date. It is possible for a student to have this educational experience during fourteen years from his kindergarten days until he is ready for a job or for some further professional or college education. Concerning each student, whenever he leaves us and whatever has been the duration of his participation with us, we can do no more than evaluate the success which he has achieved working and living here. And of our most successful graduates we can never claim that philosophical absurdity, that they are integrated, *quod erat faciendum!* They are, rather, at best, equipped physically, intellectually, emotionally, and socially to integrate further, to assimilate experiences as they go on through the inevitable, unduplicable series of conflicts that comprises life.

We can assist each of them to some measure of integration: physical health, emotional soundness, social responsibility, intellectual resolution of loyalties and "truths" into a serviceable philosophy. Other experiences will either destroy or contribute to what they have as they go from us.

This much is certain: in the same way that we identify physiological integration with the health and vitality of the biological organism, so we identify intellectual and emotional integration with the health and effectiveness of the personality; so we identify democracy, that is, social integration, with the health and worth of a society.

Programs of the Six Upper Classes

With the foregoing philosophy as a basis, the school program is constantly modified by the immediate environment and the individual abilities, interests, and other characteristics of pupils and teachers involved. Consequently the experience at a given level may vary greatly from year to year. There can be no prescribed course. This thesis is fundamental to any real integration of experience. As soon as the school overlooks or ignores elements in the total situation, or disregards gaps in the experience of either pupils or teachers, unity or coherence in thinking is lost. The following pages present the development of six classes, working in the University School under the same general philosophy, with each teacher assigned to several classes. Nevertheless, as the accounts indicate, a range of experience is evident to one who compares the procedures at any one level.

The Seventh Grade

The seventh grade is composed of thirty-five children from eleven different schools. The ages of these children range from ten to fourteen years. Only twelve of the children have had previous experience in the University School.

So, in order that these children may have the greatest opportunities for group planning and group activity, and may draw the fullest value from such socializing activity as is mentioned in the following paragraph, the morning periods from 8:45 to 10:20 have been set aside as a combined unified-studies (English, science, social science) period. The procedure follows closely the plan familiar to the twelve pupils who have come from our sixth grade. A brief rest affords relaxation near the middle of the period. Both whole group and smaller group activities of the class are centered on the unit in hand, which is carried on specifically in the unified-studies period. Any desire for individual work, connected with the unit, which cannot be handled in this morning period may be realized during the afternoon free periods.

With such a group of children it would be completely erroneous to proceed upon the traditional assumption that they have common interests, experiences, or outlooks. Instead, the children were encouraged and guided during the first few weeks

in an exploration of the possibilities of the various units that appealed to them as appropriate.

Two fields to be explored, Columbus and the University, remained after about a week of discussion by students and faculty of possible criteria or standards, and of the ways we learn. This exploration period progressed for three weeks. Advantages and disadvantages, accomplishments and failures were brought forth in a general class meeting, and the exploration period was brought to a close with the selection of Columbus as the intensive unit of study.

Some of the more specific activities in which the children had participated were: trips; functional writing; creative writing; library study and research; discussion and oral reports; the making of charts; the calculating of data; the study of people, incomes, working hours, and occupations. And then, with a few common experiences, a better understanding of the facilities and limitations of the school, and with greater appreciation of each other, they began their chosen unit. Their experiences of that exploratory period have been constantly recalled and put to use.

The present unit is focused upon the home in Columbus, or living in Columbus. The pupils are divided into small groups studying such fields as industries in Columbus, foods, natural resources, and housing conditions. These may again be subdivided, but all groups carry on their work with the main subject in view. They are constantly looking forward to the exchanging of ideas through written and oral reports, charts, other visual material, discussions, and questioning.

An arts elective hour follows the unified-studies period from 10:25 to 11:10 when these thirty-five seventh-grade students can choose one or two of the following major electives: home economics, industrial arts, fine arts, and typing. These areas are chosen either for two, three, or five days a week, and must be followed through the term. The child is helped in his choosing by the instructor. Together they discuss the possibilities of each course, the background of the child, and those things which he should expect to get from each course.

Supervised games are participated in every day for one hour just before lunch. Here the group is reorganized, and new and different possibilities for leadership are realized.

In the afternoon the seventh grade is divided into two sec-

tions for mathematics, one group meeting at one and the other at two o'clock. This seemed advisable in order to care adequately for individual differences and to meet certain limitations of the physical equipment.

In the remaining two hours of the afternoon program, which lasts until four o'clock, the child has the opportunity of carrying on both group and individual activities with the greater emphasis on the latter. It is during these two hours in the afternoon that the teacher can handle the majority of the cases of individual guidance. Friday afternoon is devoted to a special assembly program. A total of eight hours per week is open to the special electives, leaving two to five periods open for guidance of the pupils. Pertinent statements which might aid in providing for the individual differences of children are given to each instructor. The electives asked for and organized are: vocal and instrumental music, fine arts, industrial arts, leather, ceramics, typing, home economics, health and first aid, and individual problems. These individual problems include such fields as the Italian-Ethiopian conflict and its effects on the world today. These electives are scheduled for two hours per week. In the field of guidance a question which has demonstrated its worth has been, "What can I do to make the course of greater value to me and the others in the group?" Of course, such limitations as the overlapping of courses, conflicting obligations, and lack of equipment are undesired restricting factors governing the choices of the pupil.

The most advantageous point in this program is its flexibility. These electives may be brought to a close for the pupil, whenever he, the instructor of the course, and the seventh-grade advisers come to the conclusion that the child will profit more by applying himself in some other field. The pupils and teachers may feel that he needs the time for individual work or the guidance of his advisers. No child is allowed to drop a free choice until he has had some experience in exploring this field and has drawn whatever he has undertaken satisfactorily to a close.

Our intention is to guide the children, through their experiences, toward richer and fuller lives, to help them in living for the present that they may have greater comprehension in the future, to reason with them as individuals in an ever changing society, to stimulate in them the power to think, grow, and develop as children of today and the adults of tomorrow.

The Eighth Grade

For a better understanding of the present eighth grade, it is necessary to survey briefly the seventh-grade experience of last year. This consisted of a general survey of the world with special emphasis on how humans live and work together. The class met for two hours every morning, during which time they participated in class discussion or group and individual laboratory work. A large proportion of the reading, writing, speaking, painting, and shop work was done in carrying out individual and group studies and had a close and interesting relationship to their main project. In addition to this work, there were special time and assistance provided for the development of creative expression in the arts and crafts. Several field trips demonstrated the great educational value of such experiences in connection with the various studies. Parents took care of the transportation problem and thus had a fine opportunity to help in the educational process as well as to add to their own knowledge.

The present eighth grade has based its work to a large extent upon the experience of the past year. The main objective has been to develop in the student an awareness of social problems, to teach him to approach a problem alone as well as through group co-operation, and to work out a plan by which each problem may be solved.

During the first two weeks the work for the quarter was discussed with the class. By this provision for pupil planning it was possible to take into consideration the individual student's backgrounds and interests. These were listed and tabulated. The entire group expressed an interest in the changing world with particular reference to their own community. Eight study groups were set up as follows: housing, transportation, communication, recreation, health, food, clothing, and American living standards. Each child elected to work in one study group, and within the group chose a phase of the topic as his own particular contribution.

The class for approximately six weeks pursued these group studies. Two teachers of social science and one from each of the departments of fine arts, industrial arts, and home economics assisted and guided the children in their fields of study.

These group studies were supplemented by a large number of trips and excursions, giving the pupil concrete experiences

and a better understanding of the problem under investigation. The afternoon work in the various laboratories, including the library, was often a continuation of the problem studied, particularly the preparation of illustrative material in the various art forms.

The special electives activities during the two afternoon hours were as follows: fine arts, industrial arts, dramatics, marionettes, home economics, photography, ceramics, leisure reading, nature study, remedial reading, glee club, orchestra, and individual instrumental music.

The experiences of this and last year have shown a good deal of intermingling of activities between the unified studies and other areas, especially the arts. By this we mean that the children have been able to use time and teacher assistance with more regard for their immediate needs than is the case in a traditionally compartmentalized time schedule.

The Ninth Grade

THREE years ago the present group of forty ninth-graders entered our school. They have since experienced three versions of unified-studies work under three groups of teachers.

In their seventh year, four teachers, representing social-science, science, English, and domestic-arts areas, were assigned the problem of constructing with the pupils a unified-studies course. The obligation laid, was not upon each teacher to teach his own specialty, but upon all together to use their knowledge and their interest in general education to develop boys and girls. The teachers decided their first problem was to discover the interests and needs of the pupils. Accordingly, the first few meetings were spent in gathering statements from the pupils regarding their special interests. Likewise, records were made of their answers to certain questionnaires. These records revealed a general interest in many non-verbal activities. The teachers decided to turn this interest into a project organized through pupil participation in planning and in carrying it out.

The first week's survey also included a tour of the school building, acquainting all with the arts and science laboratories and the other physical resources of the school in which they were to work. During this tour, it was noticed that a basement room adjoining the dining room was almost bare and unattractive. The group decided to improve and furnish this room.

The project ended in the spring with the completion of a private dining room suitable for small groups of teachers and students. This work included many factors and details of administration. These had to be planned and executed by the students with participation of teachers. Many plans were made, written, displayed, discussed, and discarded before the final designs of color, window decoration, and furnishings were agreed upon. The boys and girls built the furniture, bought tableware, panelled and painted the walls, bought the textiles and prepared them for use.

This project also required skill in the use of new techniques. Provision was made for free reading, writing, and discussion of large social and economic implications of the experiment as it progressed. At the end of the year, about two weeks were used to study the biology of reproduction. This problem grew in part out of a study of nutrition made by a group under the home-arts teacher, and in part from the teachers' feeling that boys and girls needed a basic background for the understanding of such problems as they arose in their lives.

The year's work was an attempt to replace traditional subject-matter teaching by a project which would provide for the development of social attitudes such as co-operation and initiative. It also gave an opportunity to the teachers working with the group to provide for individual development.

To carry on the work in this fashion made heavy demands on the teachers; and, in order to adjust procedures relative to facts in the situation, they held daily meetings during most of the year wherein policies were formulated to meet an ever changing situation. Such frequent meetings are still held.

In the eighth year, with the same social-science and home-arts teachers and a new English teacher, the group undertook a study of the community in which they lived. This study of Columbus, an extension of the previous year's study of the school, began with the more important characteristics of the city. The class divided into groups. The groups included industry, transportation, communication, recreation, public welfare, housing, foreign contacts, education, and banking. To refine the study further, several groups were subdivided. After the findings were presented to the class a new phase of the city was studied. Creative writing was alloted special time within the program.

In the afternoon pupils were freed for activity in the work laboratories for other varieties of special elective activity which they inaugurated, for completing work begun in the morning, and for conferences on reading, writing, and individual personal difficulties.

This year one science, one English, and one social-science teacher were assigned the responsibility for the group (now the ninth grade). At the beginning of the work, suggested plans, which had been discussed the last two weeks of the preceding year, were submitted for class consideration. About two weeks were spent in planning a series of units which fitted into one large pattern. Each student wrote down a list of things which he thought worth studying. There were nearly three hundred such suggestions, and from these a committee, consisting of four students and two faculty members, compiled a preferred list of seventy-five for future consideration. This list was narrowed down to eight for which six groups were formed. These groups were devoted to: study of the physical universe; study of the races of man; study of four types of government; study of the culture of four nations; study of wars and conflicts; and study of the betterment of man's life. These fitted into the general pattern of the nature of the universe and the people in the world. Final presentations were made through writing, drawing and painting, modeling, and lecturing.

After a discussion, it was decided that each pupil present his results before the group. Not all their reports were of equal value either as to content or interest of preparation. Each pupil received some training and experience in making oral reports before the class. Criteria for judging these reports were drawn up by the pupils and teachers and used as a basis for class evaluation. The teacher also kept daily and weekly records of the development of the individual and from such records final evaluations were made.

A rather significant experience followed. During the last three weeks of the quarter teachers and pupils examined a list of purposes for directive development of life and education, formulated by the teachers of the group, to see whether they were clear and understandable, whether they were important, and whether each pupil could give illustrations which would aid in making them clear. These statements of purposes dealt with attitudes and desirable trends of personality in constant process

of development. The discussion was led by one of the teachers and, to the surprise of the teachers of the group, during the three weeks given to it pupil interest seemed to increase and objections to lengthy and detailed analysis decreased.

With an understanding and acceptance of these purposes, both teachers and pupils had in their mimeographed copies definite means for testing the usefulness of further plans. Eight such plans, submitted by pupils, were evaluated to determine their usefulness; and from these a plan was chosen for the remaining two quarters of the year.

Four topics for study are now being offered, each in charge of a teacher. The topics are: a study of jobs—pay, hours of work, training required—in the city of Columbus; the history of North America; biological science, especially the study of growth and reproduction; and a survey of the meaning of the arts in the development of man.

Each pupil chooses three of the four topics and each topic is studied for approximately eight weeks. At the end of this period of time the groups change and a second period of approximately eight weeks is begun. This is followed by another change in groups and a corresponding period of study of about eight weeks. Students choose the order in which they will study these topics. Each group is responsible for producing some results which will be of value to the next group studying in the field. These results range from installing equipment in the biology laboratory to the presentation of a pageant of the arts. In addition to his part in his whole group's responsibility to other groups, each pupil chooses one or more special phases of study within the field, on which he reports from time to time to the other members of his group. At the end of each unit of eight weeks, if the group feels that it has information or opinions of special value and interest to the whole class, these may be presented.

The afternoon program for the ninth grade as for seventh and eighth, makes possible careful guidance in continuing the morning's work. In addition to study the pupil may choose from a rich offering a variety of activities which further either those interests developed by the unified studies or by other experiences and needs. These include: participation in glee clubs; study of music individually or in groups; work in fine or industrial arts, often including group projects as in puppetry;

study of microscopic life; editing of literary magazine; and leisure reading. Because the amount of time needed each day for study varies, flexibility is maintained in the free-choice schedule. A change from one activity, when it has been satisfactorily completed, to a new interest is easily arranged by counseling with the teachers in charge of the class and those who direct the special work.

The Tenth Grade

THE work of the present tenth grade began in the seventh with a study of the home in which all of the students participated. While this was work in which each child chose his own part, the whole group felt responsibility for the entire project, and found it necessary to do a considerable amount of planning in order to make certain that every detail would be cared for by some one. Subject-matter, however, was in small units and comparatively unorganized. With the completion of the home project, a larger unit was undertaken, the study of Columbus. It should be noted that this project almost immediately spread to include past years and places remote from Columbus, related to the city's problems only through interest or chronology. For example, a study of transportation included a history of transportation and other phases of the subject. Here we have development of the demand for organization of areas beyond immediate need. Students increased the organization of their units until, toward the close of the eighth year, they were planning logically for three months in advance, and looking forward to an entire year for their ninth-grade unit, government. During the seventh and eighth grades they studied the following units:

The home.—a project in which they furnished and arranged the home on the third floor of the school and managed a house warming as the climax (five months).

The community.—a gradually expanding study broken up into the following divisions (thirteen months): stores and markets, industries, education, public welfare, transportation, communication, and public utilities.

The ninth-grade plan which followed, and was discussed at intervals during the last two months of the eighth grade, became a nine-months study of government. This unit was at first conceived by the class as merely the eighth phase in a

study of the community, but later was expanded to include not only state and national but international government as well. Comparisons were made between problems and their solutions in the United States and in countries with far different forms of government such as England, Russia, France, Germany, and Italy.

The gradual expansion of understanding and growth of organization in thinking were paralleled by changes in class procedure and organization. During the seventh and most of the eighth year, leisure reading was merely a personally directed matter, discussed informally with the instructor or, infrequently, in class groups. When the bulk of home reading became sufficient, pupils began talking in terms of types of

TABLE I

DIVISION OF TIME IN NINTH CORE (1934–35)

Monday	Tuesday	Wednesday	Thursday
1:00	Roll in 210		
English A* 210		English A 210	English C 210
Science B 313		Science B 313	Science A 313
Social Science C .. 204		Social Science C .. 204	Social Science B .. 204
1:45			
2:10			
English B 210		English C 210	English B 210
Science C 313		Science A 313	Science C 313
Social Science A .. 204		Social Science B .. 204	Social Science A .. 204

* Sectioning was not homogeneous.

Analysis of the foregoing schedule shows the following possibilities:

a. Each child had opportunity to meet all of the teachers.

b. There was each day one period of twenty-five minutes when all teachers and all pupils were free to meet together or to confer individually.

c. There was a long two-hour period once a week during which all groups and teachers might meet for planning and for reporting and evaluation. This period guaranteed opportunity for integration of all experiences. On the other hand, the organization of the class groups provided a certain minimum exchange of common experience not necessarily reported in the large groups.

literature. During March of the eighth year, so many questions appeared concerning how to read plays, poetry, novels, and essays, that it became necessary to organize groups within the

core-course period for this study. Organization of creative writing also was undertaken at the demand of the students who were writing more than could be adequately handled in the informal class period. Consequently, with the beginning of the ninth year, definite periods (two, forty-five–minute periods) were set aside within the core time for an organized study of literature and for creative writing. Other writing was taken care of in connection with the work in science and social science.

For most of the students a second problem in organization also appeared early in the ninth year. Before the tenth year, such organization became necessary for the entire class. They raised problems in science of sufficient complexity to demand a considerable time in finding solutions. In other words, they came to need organized courses in science. These courses had their origin and their interpretation, through the major core of government, which is, in reality, a study of human relations. Into this core went, therefore, materials from the study of drama, poetry, narrative, from the study of specific government problems, and from the study of problems in science (at first chiefly biological).

In order to preserve a schedule which would not be rigid but would permit conference between areas and individuals concerned, the division of time, which is given in Table I, was made for the two-hour period allotted to this core work.

The experiences of the class this year (now, 1935-36, tenth grade) illustrates an attempt to recognize the values of integration without losing the ability to organize material and carry on systematic and orderly study. The basic problem was recognized by both teachers and pupils.

As the children approached the end of their third year of experience in the course which they had participated in planning, their questions and comments showed their concern about their work for the next year in the tenth grade. Previous tenth-grade classes have been divided into sections which were necessarily rigid; the experience of these children with even a measure of rigidity made them look toward the future with some doubt. The faculty members working with the class in English, science, and social science, were as much concerned as the children that their tenth-grade set-up should be the result of planning, not of accident or mere tradition. The teachers felt that only through careful consideration of past experiences,

weighing of values, and planning on the basis of experiences and values could a sound solution be reached.

The Tuesday period gave an opportunity for extended discussions in groups of twelve to fourteen children with two or three of the teachers present and participating. All members of the class took part at some time and the limited size of the group imposed on each child a responsibility for thinking the problem through. The discussion was largely in terms of values, but behind each point lay shared experiences which were abundantly used by the children as illustrations. Each discussion proceeded in a different fashion, but the tremendous importance of the shared experiences was obvious in the general similarity of emphasis in all groups.

All the children insisted that the unity of the class as a working group, not merely as a social one, must somehow be preserved. To them that was a point of cardinal importance. They felt strongly that for economy of time and efficiency in work some sections would have to be made, but they grappled with the problem of preventing these divisions from being fixed. Their ninth-grade sections had begun as English groups, and although somewhat modified when extended to science and social science, the composition of the group had remained essentially the same. The children felt that sections for science should be based on science needs, and that it should somehow be possible to change sectioning in science without modifying English or social-science groupings, which should in turn be independent of each other.

Another question which came to the front in all of the discussions was that of integration. The children had been watching their problems in English, science, and social science diverging from each other and were wondering whether the unrelatedness was a necessary stage of growth and a permanent thing, or whether it was a temporary phase which would be followed by a convergence. As they considered this question, the children themselves recognized that probably both things were true, that each area would tend to become more distinct and specialized as students became more mature, but also that there was an enduring relatedness which was extremely important and should be recognized and provided for.

Someone finally made a happy suggestion. He pointed out that if the whole class were scheduled at the same time for

English with two English teachers, then the whole class could work together or could break into sections, permanent or temporary. The decision could be made by teachers and class entirely on a functional basis. If the same plan, the whole class at the same time with two teachers, were followed for science at one hour and social science at another, the class and teachers would have the same opportunity to plan on the basis of the needs of each area.

The proposal was considered carefully and was felt by everyone, children and teachers, to be a remarkably successful solution of the major issue. In order to provide the possibility for integration everyone felt that there should be at least one period a week when all the children and all the teachers could be present at the same time. These recommendations were forwarded to the faculty after receiving the assent of the whole class, and were considered in making the schedule for the tenth grade. The faculty found that, while the idea was novel, it was entirely practicable, and the class schedule was based on that. A modification of this basic schedule was also developed for eleventh- and twelfth-grade classes, as will be noted in discussion of those grades.

The Eleventh and Twelfth Grades

THIS year a progressive step was taken in the organization of the school experiences of the students in the eleventh and twelfth grades. Our efforts of previous years with rigidly sectioned and scheduled student-groups and teachers carrying a heavy educational load led to a radical solution of our chief difficulties.

Since it had been especially in the areas of English, social science, and science that we had tried vainly before to achieve sufficient flexibility for our purposes, we decided to assign a two- and a half-hour block of time and the use of from two to four rooms in the English, social science, and science laboratories to a unified-studies program for the eleventh and twelfth grades (50 students each), with the guidance of an eleventh- and twelfth-grade faculty staff (which finally comprised two full-time teachers, two full-time interne teachers, and two part-time teachers) from English, social science, and science.

Six faculty members, then, one hundred students, two to four rooms, two and a half hours each morning: within those

opportunities—a program to be worked out flexibly, to achieve the purposes of our educational philosophy, to achieve this supreme value, integration.

We achieved a paradox. Purposing flexibility, we drew up a most complicated and dove-tailed schedule.[3] Our students then divided themselves into four sections, each of about twenty-five, two sections to each grade. This achieved a maximum of use, potentially, of the available laboratories, and a teacher-student ratio in which the individual, while enjoying the stimulation and experiencing the responsibilities of a group, could not easily be lost to teacher guidance.

But we did not desire to limit the contacts of the students with one another to these four discrete roll calls. So that the autonomy of the larger grade-group should be preserved, we arranged that each grade would be able, when advisable—notably in the planning of a unit of work and in the summarizing of a unit of work or in their own self-government as a group concerned with specific grade problems such as social functions, participation in inclusive school events, graduation and so forth—to meet together as a unit. The schedule achieved this for each of the three subject areas.

Again, we realized from past experience the desirability for varying purposes (planning, laboratory activity, research involving reading, trips, presentation of reports, demonstrations, and lectures) of scheduling periods of varying lengths. This was achieved in each area for both entire grades and separate sections.

The possibility of having both eleventh and twelfth grades meet together or with other grades for some inclusive purpose lies in recognizing that there is no particular sanctity to the claims of the subject areas for their scheduled periods. At any time an activity or a program considered in traditional educational circles as extra-curricular can become curricular and supersede all other matters of schedule, if it can justify the use of the time by its probable worth.

Originally our week of mornings was partitioned rather equivalently among the three areas. Before long it was evident that this was not the best arrangement. Our students have (at least to date in our experimentation) been required to work with teachers who are specialists, each in his own of the follow-

[3] *See page 48.*

ing areas of educational experience: social science, English, science, mathematics, physical education, and arts, during at least six consecutive years. Languages are electives for the last four years; the elementary experience also involves work in all those areas. As teachers we are anxious to have as little home work or outside preparation as possible, both so that the preparation can be expertly supervised and so that the many educational experiences of the home and the community, such as leisure reading, art lessons, hobbies, lectures, radio, press, theater, forums, church, social functions, out-of-door activities, work, and the like, can be realized without conflict from assignment. Because of the two factors just presented we agreed to include within our morning block of time all the opportunity for preparation necessary, except for the minority of slow students and students who have been absent and for the minority of students with a highly specialized interest, for science and social science.

Now preparation in the two fundamental features particular to the English program, free reading and creative writing, cannot be scheduled, must be done outside of school hours. (The reading that a student does evenings, week-ends, and during vacation is the content of his English program!) The other fundamental features of the English program are: the discussion of the reading and writing done outside and the conference and guidance necessary to the individual's reading and writing level; and the functional use of tool English—as a means of communication: deriving information from verbal sources, speaking effectively in discussion, organizing written notes and written reports. The discussion and conference are allotted time on the schedule as English periods; the functional use of tool English is made a vital educational experience by means of releasing the English specialists on Monday completely and on other days partly to participate in the work of the science and social-science areas. Therefore there is an apparent, but not an actual slight to the English program in the schedule as it appears later.

The schedule just described, although it appears to be complicated, has proved its worth and its actual flexibility in practice. Potentially there are opportunities for each specialist in each area to be free for visiting his students in their other classes.

There are four hour periods after lunch for eleventh- and twelfth-graders. One of these is scheduled for mathematics and for mathematics preparation. The last hour is scheduled for physical education. The remaining two periods are partitioned by each student individually among the various arts and languages, electives, and the preparation necessary to a language elective.

It has seemed desirable to conclude this statement of the eleventh- and twelfth-grade work with an account of one strik-

TABLE II

SCHEDULE FOR ELEVENTH AND TWELFTH GRADES
CLASSES IN ENGLISH, SCIENCE, AND SOCIAL SCIENCE

8:45	9:30	10:00	10:20	11:10
Monday				
Science XI-x Science XI-y Social Science XII-x Social Science XII-y			Social Science XI-x Social Science XI-y Science XII-x Science XII-y	
Tuesday				
Science XI-x Science XI-y English XII-x	English XI-x English XI-y		Social Science XI-x Social Science XI-y	
	Science XII-x			
Social Science XII-y			English XII-y	
Wednesday				
Social Science XI-x Science XI-y Social Science XII-x English XII-y			Science XI-x Social Science XI-y English XII-x Science XII-y	
Thursday				
English XI-x	Social Science XI-x			
Science XI-y			English XI-y	
Social Science XII-x Social Science XII-y	English XII-x English XII-y		Science XII-x Science XII-y	
Friday				
English XI-x English XI-y Social Science XII-x Science XII-y			Science XI-x Social Science XI-y Science XII-x Social Science XII-y	

ingly successful experience in the integration of the three areas for our Seniors. As is evident in the statement in this BULLETIN of the social-science program through the junior and senior high-school grades, twelfth-graders return to a year's consideration of contemporary problems, looking also to the future and its demands upon them as citizens coming into responsibility. As they were discussing their plans for their year's work last October, they became involved in certain questions which reduced themselves ultimately from prejudices and vague gen-

eralizations about personality and about the individual in society, to a need for an understanding of certain biological and, particularly, psychological principles.

This need was brought out, because of the flexibility of our schedule, in the presence of teachers from all three areas. Almost immediately, within the science planning periods, we embarked upon an organization of the needed experience. A unit of work in biological, particularly psychological fundamentals! We were at that point fortunate in having in the person of one of our English specialists, a psychologist who not only had received advanced degrees in that area, not only had taught the subject and had done research in the field, but who had proved invaluable to our faculty because of her continued, current contact with that field. Furthermore, both in the analysis of the reading done by her English classes of novels, plays, poetry, biography, essays dealing with conflicts in the living of individuals in society, and in the intimate, counseling function of conferring with students in the light of their personal conflicts as revealed in their free, creative writing, she had also come to the point where she welcomed an opportunity to organize such a unit of study (especially fortunately, in the characteristically objective atmosphere of the science laboratory) as a really significant experience to serve as a foundation for the remaining months of the secondary-school experience of these boys and girls.

A glance at the schedule will indicate how it was possible for this English teacher to meet the entire twelfth grade for discussion of these matters during a long science period on Monday and a shorter science period on Thursday and each section separately for a more individualized discussion for a long period each, one on Wednesday and one on Friday. She built her discussions directly upon the biological foundation laid during October by the science teacher and upon the questions of the students which had been stimulated, as we have related, in the English, science, and social-science areas separately. In addition to discussion periods, we organized the selection by each student of an individual reading or laboratory research which we assisted him in limiting to the scope of his powers and of the school facilities.

Most rewarding of all have been the rapidly accumulating evidences of the value of this unit which lasted until Christmas.

Discussions in English classes and the papers written now show a new understanding of personality and of human conflicts, of the relation of the individual to others and to society. In science and in social science is evident a new precision of speech, a new freedom from the confusion consequent upon ignorance of the psychological factors which result in the folly of prejudice.

Perhaps a clearer example of the integration of an educational experience within three ordinarily distinct subject areas could hardly be selected than our twelfth-grade excursion last fall into these fundamentals of biology and psychology which serve as a basis for understanding the conflicts of human personalities in society.

The School Community

On the walls of a school building in New York City there appear admonishing posters which read "Children, this is your property. Do not destroy or deface it in any way. Board of Education." The posters are necessary, for the children do not recognize the school as their own community; rather the school is something which belongs to the Board of Education. What bonds does the school have with its students which would help them to regard the school as the child community? In the traditional school set-up the primary bond is athletics. The students refer to the prowess of "our team"; the old grads are magnetized to the stadium for important games. A less frequent bond for faculty, students, and graduates may be dramatics. But these bonds are based on other interests than the main business of the school, education. A sense of common purposes, the basis of a community, is lacking in the traditional school set-up save in the spectacular peripheral activities.

University School has recognized this lack in traditional education and, with its progressive philosophy, its emphasis upon participation in group purposes, could not fail to attempt solution of the problem. The attempt has involved gropings, trial-and-error experimentation, approaches adopted, revised, abandoned, accepted.

Though uncertain of a definite answer, the faculty felt that emphasis upon competitive sports with other schools was not a sound basis for an educational community and that sports for all was the better program. The faculty recognized that inte-

gration of school functions into a co-ordinated community would be a long process but that it might be, if guided, a process of continual growth. It has so proved. Among the activities with which experimentation has taken place are the assembly, the school council, all-school festivals, and other special programs. These methods will be discussed in the remainder of this article.

An early effort at integration of all classes within the school was the assembly. An all-school assembly was unsuccessful for there was a wide variation in needs and interests among individuals in the audience. Few programs were educative and interesting equally to all. A compromise device of making attendance at the assembly optional did not solve the basic weakness, and the assembly of the entire student body was abandoned. At present the seventh, eighth, and ninth grades are experimenting with weekly assembly.

The school council, composed of twelve student members and two faculty members, is slowly taking its place as an integrating governing body of the school, after some discouraging early years when the council was harassed by the impossibility of finding time within a crowded schedule for meetings, by trivial legislation, by financial irresponsibility, and by a lack of school interest and respect. The council has now attacked some of the basic difficulties. These involve administrative organization ostensibly but actually concern deep-rooted social problems. To cite some few—there is the problem of how the council is to be supported, by the pocket money of students or the pocketbook of father; the question of whether a school enterprise which makes a profit should have something to say of the disposition of that profit, the problem of whether classes should be allowed to organize formally and to work out their own types of class government. Whether representative government can be a potent force in the school community is as yet an unanswered question in University School. At any rate the student government alone cannot achieve a finally complete unification of school purposes.

All-school festival programs have been of value in building the community spirit. The annual Christmas festival provides opportunity for participation to every member of the school. A day in the past is relived, perhaps, in the Merrie England of Robin Hood and King Richard the Lion-hearted, or before

the tavern in an Elizabethan seaport town. Each individual is costumed and plays a part in the development of the theme. Such an activity, planned by representatives of all student groups, participated in by all, serves as a unifying factor.

The special activities program affords an opportunity for students to work with their fellows of other classes in activities in which they are particularly interested. Dramatics, a literary magazine, radio speaking, and consumer problems are typical activities. These activities tend to integrate the school program. Whether these educational aspects of school living will eventuate in common purposes for the school depends largely upon the planning of special activities, the execution by groups, and the extent to which other students share in the results achieved by the special groups.

Perhaps the spirit of common endeavor in the school may be built through the carrying on of all of these activities. Perhaps the spirit may better be built by contributions to school welfare which will duplicate on a larger scale an immediate experience involving actual physical improvement such as the room-furnishing experiences carried on by the cores described in this journal. Perhaps the school community will be best achieved by school action on community social problems. We are unsure of the exact technique. We have some tentative answers and we will keep on experimenting.

The Role of Subject-Matter Areas in an Integrated Curriculum

TRADITIONAL systems of subject-matter have developed largely without recognition of their relation to other systems of study. This fact is apparent when we realize that the introduction of a new area of learning to a curriculum does not ordinarily call for any reorganization of other areas, or systems of study. Consequently, a curriculum which endeavors to provide an integrated experience will frequently find itself in conflict with the rate and the content of traditional courses of study, logical though they may be. The following statements concerning special areas and interests are representative of the changed attitude which the integrated curriculum has developed in the minds of subject-matter specialists at the University School. The reader should note that the resulting concepts are more inclusive than those necessitated by a conventional curriculum. It has been the experience of the staff that integration has stimulated and extended the teacher's concept and study. The specialist loses his prejudice but finds ample need for his best attainment.

The Arts

IN THE arts program in the University School, music, home economics, and the industrial and fine arts have a double function, for the pupils in the school have the opportunity to elect to work in one or more of the arts areas on the same basis as they choose to join a foreign-language class or a special science or mathematics group. Distinct from these special arts activities with the pupil-teacher planned programs is the contribution the arts areas make to the whole school program. In the seventh, eighth, and ninth grades the unified-studies faculty includes a representative of one of the arts fields, and arts teachers or members of arts groups are frequently called upon to make their contribution to social science, science, language, or mathematics classes.

It is important that in the specialized arts work which is being carried on in the various well-equipped laboratories, the whole school philosophy is the chief factor in determining the approach to subject-matter, the procedure involved in planning and carrying out activity, and the pupil-teacher relationships.

A growing understanding and agreement between the teachers in the various arts fields has enabled the arts to become more and more an integrating factor in the whole school experience of the child. The arts teachers are thought of as general educators rather than as specialists in art. They believe definitely that no one type of art experience is an equivalent for all others and that for the child such experiences should be as varied as possible with emphasis on one or more of the arts fields.

For the work in the arts laboratories the time reserved in the schedule varies with the grade-level and with the individual within the grade. Thus those children who learn most satisfactorily through the arts experiences may be able to spend several hours a day in the workshops, while others may have one period or less each day of this individual or group arts activity.

Among the chief factors in the integration of the child's school experiences are school assemblies, Christmas pageants, games, and May festivals. The interest and abilities of each child in the school are utilized in creating the spirit of these natural social situations.

The relationship between the arts and the seventh-, eighth-, and ninth-grade unified studies may be perhaps best explained by examples of different activities. Pupils wrote and sang songs which were instigated by their work; they used all available reference material in planning; they wrote creatively about their interests and feelings during this period; they experimented in science with the materials they used in painting the walls, building the furniture, and making the cushions and draperies. In the spring of the year they opened the room with a music program and luncheon. This does not mean to indicate that the arts usually stand at the center of the work of these groups, for the programs vary with the specific needs and abilities of each group of faculty and pupils.

The whole spirit of the period between the Civil War and the present day was instilled in eleventh- and twelfth-grade social-science units when they called in school singers and instrumental groups to illustrate what the music of that time was like. They had the opportunity to relive the past with the old-time band and minstrel. They saw the symphony develop. They recognized the relationship between the grand opera and the latter part of the nineteenth century, which led to a better understanding of each. They caught the spirit of the "Bicycle

Built for Two" song, and, what is more important, they began to realize how modern music, the airplane, and the automobile are among the products of our age which will serve best to determine for future generations how we feel about things and what we are interested in.

In similar ways the language, the science, and the mathematics classes welcome the contribution the arts can make to a better understanding of particular subjects and the seeing of the relationships between all phases of past and present living. Thus it is a rare occasion for a period to pass when members of almost any class in the school cannot be found hard at work in the arts laboratories clarifying and turning to practical application elements of every type of school experience.

We have an unqualified conviction that the satisfaction and enriched experience which have come to pupils through the various arts have meant a better understanding of all experience and an emotional and intellectual release.

Physical Education and Health

THE very term "physical education" is a misnomer for it implies a philosophy of dualism which is inimical to the facts of the unity of the organism. "Health education" is an equally noxious term for it implies a special course in hygiene or "how to be healthy" where health concepts are taught frequently from a book. Evidences of integration might best be sought in the behavior of children. We try not to ask ourselves, "Do children understand health concepts?" but rather "Do children act as if they understand health concepts?" Emphasis, therefore, is not on health instruction but on activities which introduce health concepts when they are related to the child and his environment.

Our concept of health includes harmony of function, vigor, and quiet joy, and emphasizes the unity of the organism: the integration of the personality where children are not fighting bodily discord, on one hand, and the liabilities of social existence, on the other. An effort is being made to honor "*Mens sana in corpore sano*" in practice as well as quotation.

Teachers, for example, understand that a child's whole physiology may be affected by a change in his social status in the group; that suggestion sometimes works curative wonders; and that deficiency in the activity of the thyroid may cause

arrest of mental and physical development. Such phrases as "curative pedagogy" and "diagnostic and remedial teaching" must become everyday realities in practice.

When the aims of good education and hygiene become the same, the education of the "whole" child can become a reality. Good education then becomes a condition of normal development, both somatic and mental, and teachers become as concerned about the quirks of the personality as they do about deviations from the normal body.

Health, therefore, is not the responsibility of a few specialists but of all teachers. The specialists, however—the school physicians, the psychologist, the school nurse, the physical education teachers—are present in the school set-up and constantly focus the attention of the staff on important facts concerning individuals and situations. In this way they help staff members and students to see new relationships and make new interpretations, thereby assisting the process of integration. The school program for health might be said to stand on three legs:

Health protection is concerned with adequate health examination and elimination of the strains and drains of remediable defects. It is also concerned with the control of the school environment in the interests of health.

Health teaching refers to the use of ideas, philosophy, and practice of that personal conduct that conserves and promotes health. The emphasis here is not in telling children how to act but in giving them opportunity to act. It is here that the dining room, the science laboratory, the health office, and the playground become places where much systematic incidental health teaching takes place. No health "course" as such is taught.

Physical-education activities form the chief motives for following those health practices which make for greater efficiency. Children are not interested in health as an abstraction but are tremendously interested in activity. Illness prevents activity and attainment of vital individual and social goals. Children will therefore often follow a Spartan regimen to attain them, especially if guided by good leadership.

The integrated efforts for the health of children come to a focus before the Health Committee, composed of the school physicians, the psychologist, the school nurse, the dietitian, a representative of the lower grades, the teachers of physical education, and the assistant director of the school who acts as chairman and is the chief contact with the parents.

This committee meets on alternate weeks and takes for its

chief functions the following responsibilities: to act as a clearing house for considering the specific problems of individual students who show evidence of maladjustment; to carry each case through to some definite conclusion with the aid of parents, teachers, and family physician; to check the health examination and make recommendations to parents and teachers; and to work hand in hand with parents and counseling teachers by assisting with records, tests, and in interpretations of medical and psychological experience.

Language—English and Foreign

THE language program in a progressive-school curriculum is a most difficult matter to analyze. Language develops as a function of normal living. Reading and writing, which are merely extension of language activity, are necessary to progress in all areas of study. The question therefore has been raised at the University School as to whether special courses in English were necessary. While it has been apparent that little progress in foreign language could be made without a special class, study was made of the entire program to determine whether the English teacher might not best function in classes with teachers of other subject-matter areas. In the unified-studies courses, as noted previously, such a plan has been followed. On some days the discussion concerns especially the leisure reading and the writing of the children, but the major problems of writing, reference reading, organization of oral and written reports, and effectiveness of speaking are considered as they arise in the process of the general problem. English is, consequently, an integral part of the curriculum, the English teacher merely a member of the class faculty whose special duty it is to be sensitive to the matter of language development in reading, writing, speaking, and listening. As reading of literature and creative writing come to present more complex problems and require longer periods for discussion and investigation, special classes in English are organized. There is always, however, as has been noted in discussion of the unified studies for the upper grades, time for the teacher of English to work in the science or social-science class itself.

Special avenues of language, however, develop at various stages. The field of mathematics has such a specialized vocabulary that it may be and sometimes is, called a language. Such

special vocabularies do not grow gradually, but some times, at least, are acquired hurriedly. Similarly there may come a time when the most profitable expansion for language may come through an added tongue. Care must be taken to make certain the development is a necessary one. Moreover, since in America one teacher of a foreign language and a few books must take the place of a social group, the necessity must be strong enough to overcome these unnatural difficulties. At the University School the study of French, German, or Latin is carried on in separate classes, but, as is seen from the foregoing, is related to development in English. Since the study of a foreign language thus appears as an extension of interest in a foreign culture and also in use of language, the teachers of English and of social science confer with students who desire to begin such work. They consider not only the child's background of general social understanding, but his development in reading and writing his native tongue. It seems doubtful that the individual who reads little in his own literature will ever read the literature of France, Germany, or Italy except under constraint. It appears more advisable for him to use his energies in reading material which does not offer serious vocabulary and structural difficulties. Consequently pupils at University School read extensively in English before attempting a foreign-language class.

Examination of criteria developed in the eleventh and twelfth years by students in the English classes reveals the integration of the reading program with the content of other language courses and with less closely related fields. The criteria follow:

1. Is my reading free as to types? That is, do I read all types—drama, poetry, fiction, essay, biography—with ease and understanding which are unhampered by the form?
2. Is my reading varied as to subject-matter? Can I read a book on science, social problems, art?
3. Is my reading varied as to the social culture presented? That is, can I adjust myself to a setting other than my own?
4. Is my reading varied as to nationality of the writer? (Note: Matter read may be in either translation or original, depending on development of the individual)
5. Is my reading varied as to the historic background of the writer? Can I read material written from the standpoint of a previous culture?

It may be noted that many of these criteria themselves in-

volve understandings developed in areas other than English or foreign language. It is the province of the teacher of literature, however, to see that those understandings apply in the reading of the child. Music and graphic and plastic art are also factors in the study of the various literatures. Pupils compare techniques in these related fields. Biological, psychological, and social concepts are basic to interpretation of books. Great responsibility rests with the teacher of the vernacular. The English class becomes a strong integrating factor in the program, and a test of the ability of the individual to integrate his experiences.

Mathematics

IN MATHEMATICS there are two phases of demonstration. The first is quite applicable to the junior–high school levels of maturity, and is that of indicating, directing toward, assisting to discover through experience. This is the method of experiment which sums up and generalizes. The second method is quite applicable to the senior–high school levels of maturity, and is that of the nature of proof: "of logical reasoning from premises assumed to possess logical completeness."[4]

The junior–high school program is concerned with the concepts of number (whole, fraction, decimal fraction, directed, irrational), estimation and measurement, geometric forms, verbal problems, formula, equation, table, graph, and their relationships applied to such areas as industrial arts, physics, chemistry, home economics, biology, physical education and health, social science, fine arts of drawing and music, and administrative practice.

Examples from the seventh level—

1. Two boys determined how to arrange seats and tables for 200 persons, in a room of given size, for a program of known content. This project involved estimation, measurement, geometric form, whole and fractional numbers, addition, subtraction, division, and multiplication with application to and relationships with administrative and committee practices, home economics, and industrial arts.
2. Two girls determined how many pounds of seed were needed to resow an area of the physical-education playground. The application was to an actual problem and relationships were set up with the needs of the physical-education program.

[4] Dewey, John. *Nature-Experience*, pp. 10–11.

3. Two boys constructed a device to determine the value of, and two devices to determine the area of a circle. This project involved number, estimation, measurement, geometric form with application to wood and relationships with industrial arts and science.
4. Four boys constructed graphs recording the data of heights and weights of their seventh-grade group. This involved measurement, number, geometric form, table, graph.
5. Two girls in their study of a social science problem constructed a graph involving addition, division, and percentage.

Examples from the ninth level—

1. The group began their study with the development of the formulas for such figures as triangle, rectangle, trapezoid, and circle; then the application of these in combination to common objects in the environment such as lamps, thumb tacks, and saws for both areas and volume formulas. This was followed by a trip to the mechanical-engineering laboratory to observe how such forms as gear teeth, axles, cylinders of engines, and cones of metal were always comprised of the basic geometric forms. The unit developed with uses of the forms in building construction, in sciences like physics and chemistry, in fine arts, industrial arts, and home economics. The work was further developed to the point where pupils were creating their own application of the basic geometric forms to common objects of their observation.
2. The group studied the concepts of verbal problem, formula, equation, table, graph, and their relationships; how to derive from four of the concepts given the data for the fifth concept; and which of these concepts, with what degree of precision, were applied to such areas as physics, biology, social science, and fine arts. Again this unit was developed to the point where individuals carried on with their own creations of formulas to different problems of their choice.
3. The group studied the concept of balance in an equation; how to manage the quantities in an equation without destroying the balance represented through the sign of equality; the application of the concept of balance to levers, bridges, personality traits, body balance, food balance, oxygen- and carbon-dioxide balance, in areas such as home economics, fine arts, industrial arts, and science.
4. The group studied the concept of directed numbers; the reading of numbers from left to right or right to left, and the meaning of zero; the applications of directed numbers to directed forces, automobiles, football, street cars, elevators, bank accounts, temperature, elevation, achievement-test scores, height and weight values, calendars of different peoples, social-science issues, fine-arts productions.

These illustrations indicate a definite effort to select types of materials closely correlated to a definite end. That end is

integration of the concepts of mathematics among themselves and their application to various areas of reality.

One of the most important concepts as well as one of the most basic to modern life is the nature of proof. While it is possible to emphasize this concept in all areas where abstract thinking occurs, mathematics is peculiarly qualified to develop a pupil's understanding of just what is involved in proving something. Demonstrative geometry is the means through which we attempt to accomplish this purpose, but we can find no justification for requiring the pupils to prove a certain number of theorems determined in advance. Furthermore, the emphasis is not placed on the conclusions reached but rather on the method of thinking by which they are established. These conclusions are not absolutely true. Their truth depends on the definitions and assumptions from which they are deduced, and any change in one or more of these definitions and assumptions will change the conclusions. It is thus possible to extend the study of proof beyond the narrow confines of geometry and to examine some of the countless propositions which are found in other areas of life; as, for example, the kind of advertising to which students are daily exposed is a fertile field in this connection. Behind every advertisement is a multitude of assumptions, and the pupils have become greatly interested in listing the assumptions made by the person who buys the advertised article through the influence of the advertisement. On the whole, the experience has had a decided influence on their ability to detect these assumptions, and in many cases the pupils have stated that they are becoming more resistant to advertising and are looking for proof of the facts stated. Many of them have voluntarily submitted their analyses of advertisements which they have found in their reading, with a further statement concerning the assumptions which they accept and those which they reject. This illustrates how their thinking about matters involving proof has been changed. If we accept the fundamental assumption that "mathematical thinking occurs wherever inferences are drawn logically," we have a key which opens the mathematics classroom to all phases of human activity. One of the most far reaching developments in man's eternal search for truth is the realization that all the conclusions of mathematics, regarded for so long as being absolutely true, depend in the final analysis on a series of assumptions.

This indeed is true of the conclusions reached in any area of thought and to make pupils conscious of this tremendous fact is to equip them with a powerful method of thinking about the problems of modern life.

Science

THE experiences of the last three years of science teaching in the University School have led us to a number of policies and procedures, conclusions which apparently could never have been achieved by philosophizing alone but only through working in actual situations that challenged us to intimate co-operation with the other areas. Our provision of a continuous fourteen-year experience in science has been thoroughly justified, we feel, in practice, and we have been able to draw up tentatively the following statement of the total content of the area:

1. Scientific thinking (not to be considered as particular to this area nor as a unit of study) but rather as applicable to all problems, its limitations and its possibilities; as evident in the classical achievements of scientific investigators; as a socially necessary function; as learned (among other ways) by the devising, executing, and interpreting of controlled experiments or observations.
2. Maintenance of the individual's original curiosity about the world and himself through the translation of that curiosity from naïveté to an intellectual compulsion.
3. The scientific world-picture (from electrons to galaxies, without dogma, but rather with a real understanding of the 1936 A.D. relativity of human knowledge) for the purpose of the individual's achievement of perspective.
4. Those scientific principles necessary to intelligent behavior from the point of view of individual and community health, physical and mental; the social responsibility of the "good life," a new morality predicated in terms of effectiveness and integrity in social relationships.
5. The adventure of civilization: the social conquest of natural materials and forces through the application of scientific principles (from metallurgy and dynamos to medicine, radio, and aircraft.
6. Science and human relations: scientific thinking and principles of the present political, social, and economic disintegration of the species.

Every one of these divisions of the content is pertinent to the intellectual and emotional growth of the child at any level of his school experience. This is not to say that the organization of the work or that the nature or scope or implications of the specific problems arising can possibly be the same on one level

as on another. In the elementary-school and junior-high (Grades VIII-IX) program, science is studied at any time when it is necessary for the solution of individual or group problems. These experiences are organized by the group. A science problem can become at any time the central emphasis in the unit of work; it may be a profitable, temporary digression; it may be one of the divisions in the study of a larger, possibly a "social science" unit. The one science unit which has demonstrated its worth and its appropriateness within this level of growth during the last three years, is the "science of human reproduction." That this intimate need of children in the early years of adolescence has been expressed and has achieved the recognition of the school community is a healthful indication of integration between the school experience and the life of the student.

At present it seems to be in the ninth-grade year that the science area emerges as one of several particular fields of experience which the students recognize as including the consideration and, in one degree or another, the solution of certain significant and long-term problems necessitating the setting aside throughout the year of a regular time within their weekly program.

These areas do not actually lose sight of one another in the ninth, tenth, eleventh, and twelfth periods. The three- or four-year science program that emerges for each student group as it passes through these levels of experience, remains flexible in its organization. We have achieved the elimination of the traditional, formal division of the area into biology, chemistry, and physics and have provided instead opportunity for meeting the significant demands of our young people, by this time experienced in planning (with the guidance of the teacher) their own educational experiences. The content of such a sequence of experiences cannot be identical for any two successive levels of children, but it has already been possible for us to chart the general divisions of scientific experience and the large, significant concepts that have demonstrated their urgency and value. A group problem arising in some other area in the school or community life can at any time have precedence over the scientific problem in hand.

We have found that a reference library with a variety of textbooks and the organization of work with division of the

labor and responsibility have every advantage over the use of one book with its predetermined organization and regimented assignments. The function of the science laboratory is consistent with its historical, research significance; nothing can prove much more valuable to the student than an experience involving his own solution of a problem.

We feel that there is no justification of a science experience which has no implications beyond its alleged factuality. Unless science has implications in the thinking and living of the students, at the time and afterwards, the science program has evaded its responsibility and its challenge. In the need of our time, there can be no defense for the neglect of the implications of scientific discoveries and thinking as an intelligent procedure.

Social Science

THE quest of the modern educator is for unified experiences which will be life situations. In the social sciences the educator came somewhat nearer to ideal education when he achieved the welding of history, geography, economics, and sociology into a single whole. In the high school this unification of several related subjects has been called social science. The high-school course in social science has come increasingly to be taught as a unit, and the several subject fields of the social sciences have contributed that information necessary for the solution of social problems of vital concern to the students.

University School has of course recognized since the inception of the school this intelligent union. Social science, organized in this manner, is one of the areas of learning within the school. University School, however, has gone some pioneering steps beyond integration of several disciplines into a co-ordinated course. In the seventh, eighth, and ninth grades, as described in other articles in this report, social science is one of the areas co-operating in the "core" or unified-studies program. Here, when a problem is attacked, social science sheds what light it can, science supplies information, techniques, or materials desirable for the solution of the problem, the arts make their particular contributions, and the Engish area assists with the problem of the resulting reading and writing of students. In the tenth, eleventh, and twelfth grades where interests and needs have become more specialized with increasing maturity, the areas are no longer amalgamated but separate areas of

learning emerge. This does not imply that there is no further integration between social science and the arts, to cite one example. It does imply that integration can arise only from a felt need for co-operative action within either area.

An interesting co-ordination was recently achieved with a tenth grade. In social science the project embarked upon was a study of the Elizabethan period. After individual investigations of life in that age had been conducted by the students there was an expressed desire for the translation of this study into an art form. The students felt that they might perpetuate their findings, that they might make a permanent contribution to the school body, that they might express their understanding of the Elizabethan age through a more appropriate medium than merely the unfeeling written report. The social-science teacher appreciated the students' attitude and, in addition, felt that such an undertaking involving manual work and physical co-operation might help the group to achieve a fine solidarity, that such an art experience with a group which used the art laboratories only infrequently would be revealing to many students. The co-operation of the art teacher was enlisted, and the major part of the group worked on a series of eight panels depicting phases of Elizabethan life. A few individuals worked in the shop on the construction of ship models or with the home-economics specialist in costuming dolls in period clothes. The completed panels were installed in the social-science room as a base for the operations of this tenth grade.

Another example of co-ordination of the gifts of specialists occurred within an eleventh grade when the group commandeered the services of teachers of fine arts, mathematics, and music, as well as the aid of a veteran archaeologist of Ohio State University in order to understand better the cultures of the Indians of ancient America. These specialists were simply requested to illustrate in whatever ways they thought desirable the contributions of Indian civilizations to the fields of experience they represented. The fine-arts teacher delivered a lecture accompanied by lantern slides on Indian art and architecture, and explained Indian art symbolism through elaborate designs on the blackboards. The mathematics teacher demonstrated the Inca *quipu* or string of knots which served the Peruvians as a measuring and counting system, described the development of the number systems, and talked of astronomical advance of

American primitives. The music teacher described the rhythms of Indian music and presented samples of Indian music through various instruments. The archaeologist described the science of digging and the significance of archaeology for students of society. In a later investigation of specific phases of Indian types, the students examined the literature of the Indian peoples and read upon the scientific and medical development of the Indian.

In another eleventh-grade section the music group worked in a close relationship with social science. In a study of the period of the Civil War, group discussion of songs and group singing provided an enjoyable and educative part of class work. When the study dealt with the turn of the nineteenth century, the ideas, inventions, and spirit of the time, as reflected in the popular songs, formed a part of the general inquiry.

A twelfth grade studying the distribution of wealth in the United States found their most reliable source of information in the recent study made by Brookings Institute—*America's Capacity to Consume.* Desiring to express some important data graphically in order to understand the social structure of America, the group found it valuable to work in close touch with the mathematics and fine-arts specialists. In testing the ability of the class to draw logical conclusions from graphs and data, techniques in "the nature of proof" first worked out by a mathematics specialist were utilized. As described elsewhere in this summary, a study of psychology had its inception in the confused beliefs as to human nature manifested by students in attempting to interpret the significance of America's maladjusted distribution of wealth.

Limitations of space forbid the citation of further examples from the upper grades. That integration is inherent in the schedule and school set-up of the seventh, eighth, and ninth grades should be apparent to the careful reader. The home-building experiences of these grades have, typically, afforded opportunities for children to test materials of many sorts in the science laboratories before purchasing equipment, for construction of furniture in the industrial-arts laboratories, and for such home-economics work as planning tasteful furnishings and decoration. Opportunities for integration in the education of children are legion; in University School these opportunities which arise through social science are capitalized, and unified experiences eventuate in situations approximating life.